

K/EM-124

AIR ANALYSES-K-1421 INCINERATOR STACKS

Compiled by
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Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

April 18, 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7101
managed by MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

This document has been approved for release
to the public by:

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Technical Information Officer
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4/19/95
Date

INTER-COMPANY CORRESPONDENCE

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ANSWERING LETTER DATE

SUBJECT

Introduction: On March 3, 1955, Department 2619 had a batch of depleted uranium salvage processed in the K-25 incenerator in order to gain experience and information which would be helpful in deciding whether the installation of the similar unit in Y-12 would be advantageous. In order to assemble pertinent information on the uranium air levels associated with such an operation the Y-12 Health Physics Department took two series of air analyses.

Procedure and Results: The first series of samples was taken in the effluent gas approximately two feet from the top of the exhaust stack. A right angle probe was inserted into the stack, and the particulate matter from a known volume of effluent was collected in slightly nitric acid solutions using giant impingers. The solutions were analyzed for uranium. Rate loss figures were obtained by using the rated capacity of the exhaust system (5600 cfm) and the loss per unit volume calculated from the sample results. Attached (in Table I) is a listing of the results along with supplementary information on incenerator loadings and temperatures during the time of the sampling.

Another series was made in the charging room by drawing a known volume of air through paper filters. The amount of particulate uranium on filter was determined by making an alpha count on the paper in a proportional counter. Such sampling gives an approximation of the levels of air borne uranium to which the operator of such a unit would be subjected. Attached (in Table II) is a summary of the results of these samples.

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Conclusions:

The following conclusions can be made from the air sample results:

1. The K-25 incenerator is adequate from a health standpoint for operating personnel when normal or depleted uranium salvage of the type tested is being processed.

3. It would be possible to exhaust the effluent from the burning of normal uranium salvage with no more cleaning than it is being given in the K-25 unit, if the incenerator were strategically located and/or properly stacked.

Table I

Stack Effluent Analysis Results

Sample No.	Time Started	Time Finished	Concentration $\mu\text{g}/\text{m}^3$	Date of Loss <u>Sept. 11/48.</u>	Wt. of Salvage Added to Incinerator During Time of Sample	Temperature of Incinerator Degrees Fahrenheit
1	10:52	10:32	25.5	8.6	182	800° - 900°
2	10:50	11:30	11.0	3.7	375	1100 - 1300
3	11:35	12:35	24.7	8.3	214	Approx. 1300
4	12:36	13:11	8.8	3.0	212	Approx. 1320
5	13:20	13:35	13.0	6.4	99	1400 - 1600
6	13:40	13:45	34.7	11.7	85	1600 - 1700
Average			20.6 ¹	6.9		

Table II

Charging Room Air Results

Operation	No. of Samples	Per Cent Samples > MPEL*	Avg. Time of Sample (min.)	Air Concentration (d/m/m ³)	
				Low	High Average
Stirring material inside furnace **	6	50	1	0	391 116
Loading furnace	2	100	1	87	261 174
General air, 3 feet from furnace	8	0	31	3	61 8
General air, 10 feet from furnace	5	0	59	1	25 8

* The MPEL was determined to be 100 d/m/m³ for uranium in air is 70 disintegration per minute/cubic meter (d/m/m³).

** This operation was done during the time the furnace was operating at a relatively low temperature. It was found that such stirring was unnecessary at the higher temperatures.